Advanced Building Energy Codes

Policy Summary: In 2008, Massachusetts adopted a requirement that building energy codes meet or exceed the latest International Energy Conservation Code (IECC) and stay current with its three-year update cycle. In addition, the Commonwealth developed one of the first "stretch" energy codes. The stretch code moves away from the traditional code approach that prescribes specific energy requirements for new building components (levels of wall insulation, rates of air leakage, etc.), toward a performance-oriented code that mandates a percentage reduction in total building energy use, while allowing developers to make their own design choices on how to achieve that reduction. This policy would continue the transition to performance-based codes by 2020 that go beyond the IECC codes in terms of efficiency while reducing the length and complexity of building code.

	Savings from full policy implementation	% of 1990 level
Economy-wide GHG reductions in 2020	1.5 $MMTCO_2e$	1.6%[50]
Natural gas GHG reductions in 2020	1.2 $MMTCO_2e$	
Heating oil GHG reductions in 2020	0.3 $MMTCO_2e$	

Clean Energy Economy Impacts: Building design and construction is one of the largest economic sectors in the U.S., and is a major employer of skilled labor, with excellent potential for clean energy job growth. Each year, new construction is estimated to account for 0.5 percent to 1 percent of the total building stock. In addition, major renovations of existing buildings trigger code compliance requirements, and, by 2050, will affect the majority of existing buildings. The avoided fuel and electric costs due to enhanced codes reduce the long-term operational costs of real estate and increase their market value and durability.

Rationale: Massachusetts has historically been at the forefront of energy efficiency in state building codes. This policy position is strongly supported by the underlying economics, emphasized in analyses such as the McKinsey U.S. climate policy studies, which point to modernized energy codes as one of the most cost-effective climate mitigation strategies. Furthermore, given the long lifespan of the building stock, decisions made today affect energy demands of the buildings sector for the rest of the century and beyond.

Design Issues: Building energy codes are relatively complex, particularly for commercial buildings, and there are numerous stakeholders across the design and construction supply chain to factor into the rate of improvement that is possible. The shift from prescriptive codes to performance-based codes that directly measure and reduce energy waste presents a clear opportunity to improve energy codes.

In the residential sector, the Massachusetts Department of Energy Resources (DOER) 'Pathway to Zero' program recently gave awards to approximately 200 homes designed with

[50] Based on updated 2015 analysis of building permits in all towns and cities in MA by Abt Associates.

performance-based Home Energy Rating System (HERS) index ratings of zero or lower. This demonstrates that the Commonwealth has several industry-leading developers who can build and sell 'net zero energy' homes at both market and affordable housing prices today. However, a broader market transition to low energy buildings will take time, requiring incremental improvements to building codes and a supporting framework of training, outreach, incentives and technical assistance. In 2013, more than 6,300 new homes (43% of new units) in Massachusetts used the performance energy code, with an average HERS score of 59. At the end of 2015, there are over 160 towns and cities that have elected to adopt the stretch energy code, which requires HERS ratings on new homes. A gradual ratcheting down of the maximum allowable HERS index for new construction allows home builders and their subcontractors the time to retrain and modernize their design practices to meet performance targets without significant changes to the cost of construction.

Costs: On average, up-front design and construction costs are likely to increase marginally as energy code performance increases. To date, cost estimates have been in the 1 percent to 3 percent range for both residential and commercial buildings that achieve a 20 percent improvement over the base code. In return for this upfront investment, the developer is able to more clearly differentiate new construction as higher-performance than existing buildings, and the tenants of the building receive significant energy cost savings that outweigh the upfront costs.

Legal Authority: The building energy code is governed by the independent Board of Building Regulation and Standards (BBRS). The Massachusetts Department of Public Safety (DPS) and DOER will continue working together to craft future energy code provisions for consideration by the BBRS.

Implementation Issues: The buildings sector has followed a market-led transition to performance-based energy codes using HERs ratings and LEED/ASHRAE energy modeling remarkably smoothly. However, as energy code requirements change, there is an ongoing need for training and technical assistance. In order to support and improve energy code compliance, Mass Save® utility funding has been committed beginning in late 2014 to provide ongoing training in best practices to builders, designers, and subcontractors working in the new construction and retrofit markets for both commercial and residential sectors.

Uncertainty: With the baseline energy codes in Massachusetts now tied to decisions of the International Code Council (ICC), there is a delegation of authority to this national body. The uncertainty inherent in relying on the ICC could be reduced by laying out an energy code road map at the state level. The impact of energy codes on GHG emissions in any particular year also depends greatly on the weather.